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AUTHOR Adduci, Lynne L.
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ABSTRACT

An evaluation was conducted of the numbers of student who move both within and into the Orange Township School District, New Jersey, and the impact of this student mobility on academic achievement. The district is in a small urban city located within the metropolitan New York area. The study was conducted at the Orange High School, using a sample of 198 tenth-grade students for whom the most recent scores on the state mandated High School Proficiency Test (HSPT) were available. Data on students' family structure, primary language, and socioeconomic status were also collected for use as control variables in the analysis. Student mobility was measured by the number of consecutive uninterrupted years in the district, the number of moves, and the distance of the move. The results indicated a high degree of mobility, and that mobility did not affect student achievement. The mobility factors explained only 1.8% more of student achievement than did the non-mobility factors. Student language was the only variable consistently related to HSPT performance for students who transferred into the district from both outside the United States and within the United States. Even with the mobility factors taken into consideration, students who spoke only English scored almost six points higher on the HSPT than students who did not speak only English. The results suggests that whether or not a students speaks only English at home is an area that the Orange School District can focus on as it strives to improve student achievement. (HTH)

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Mobility and Student Achievement in Orange High School

Lynne L. Adduci

RBS Research for Better Schools, Inc.
444 North Third Street
Philadelphia, PA 19123

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MOBILITY AND STUDENT ACHIEVEMENT IN ORANGE HIGH SCHOOL

At the request of the Orange Township School District (NJ), Research for Better Schools conducted an assessment of the extent of mobility in Orange High School. This document represents the final report of that study. The major goals identified and addressed here, as required by Level III New Jersey State Department of Education Monitoring directives are: the identification of the numbers of students who move both within and into the district; and an assessment of the impact of student mobility on student achievement. Student performance on the High School Proficiency Test (HSPT) will be used as the indicator of achievement. This report will first provide a review of the mobility literature before introducing details of the study including the research design, data and measurement, results, and the conclusion.

Review

Between 1975 and 1980, 45 percent of the American population changed its place of residence at least once. Each year, 17 percent of school aged children and youth move (Bureau of Census, 1986). Studies of the effects of this geographic mobility on children's emotional and cognitive development and academic achievement have produced inconsistent results. However, researchers hypothesize that relocation and the lack of uniform curriculum across schools negatively affect the development of students' basic skills.

Mobility and Student Achievement

In their review of mobility studies, Barrett and Noble (1973) found little consistent data relating mobility to children's performance in school. A decrease in student achievement due to mobility was found in a

number of studies (Benson, Haycraft, Stayaert, & Weigel, 1979; Benson & Weigel, 1981; Straits, 1987). Morris, Pestaner, and Nelson (1967) found mixed effects of mobility on reading and math achievement; mobility affected reading achievement but not math. Geographic mobility in an urban school setting had an adverse influence on student achievement (Ingersoll, Scamman & Eckerling, 1989).

Other Educational Effects

Student mobility is also hypothesized to disrupt language development and socialization, lessen motivation, and increase the likelihood of early school withdrawal. Some data indicate that mobility heightens achievement differences that already exist; that it cannot be pinponted as a cause of poor achievement or adjustment, but that it is a complicating factor for a child who has other characteristics of being at-risk (Newman, 1988; Frenza, 1984; Whalen & Fried, 1973).

Other Factors

Factors such as socioeconomic status, family structure, and English as a second language, have repeatedly been linked to mobility (Newman, 1988) and may adversely affect student achievement (Averch, Carroll, Donaldson, Kiesling, & Pincus, 1974).

Socioeconomic status. Socioeconomic status (SES) has been shown to be an important variable in many studies which show a negative relationship between mobility and student achievement (Straits, 1987; Lacey & Blane, 1979; Morris et al., 1967). In Sexton's (1961) study of schools serving low income families, for families with yearly incomes of less than $3,000 per year there was a 49 percent turnover, while for familes with incomes of

greater than $9,000 per year there was a 17 percent pupil turnover. Higher SES has long been associated with better student achievement (Sewell & Shah, 1968).

Family structure. Researchers have not yet determined how family structure affects student achievement and mobility. Studies have shown that children living with only their mothers perform more poorly in school, have less effective study habits, and have higher tardiness rates than students from two-parent families (Shinn, 1978; Hetherington, Camara, & Featherman, 1983). There is consistent evidence that children from divorced families experience short- and long-term deficits in academic performance. However, this relationship diminishes when socioeconomic factors are controlled. These deficits are largely attributed to decline in family income, the poorer quality of child supervision associated with single parenthood, and other factors that are correlated with family structure and adult educational attainment (Shinn, 1978; Hetherington, Camara, & Featherman, 1983; Kurdek & Sinclair, 1988). Although family structure as related to student mobility is rarely addressed in the research, it is hypothesized that children who reside with relatives and one parent are much more likely to be mobile than those living with two parents.

Language. Language is another important variable which needs to be explored further in student mobility studies. Calabrese (1989) found that Hispanics and Cambodians had the highest levels of alienation due to mobility. He attributes this to their immigration from a foreign culture and their isolation from significant interaction with the dominant group because of their color, language, and culture. Straits (1987) found that the detrimental effect of a move on children's progress in school is a function of the cultural difference between the previous and the current

places of residence, but this was true only among teenagers with less-educated parents. Included in his analysis are such factors as environmental change resulting from migration (distance of transfer), the length of time in the current place of residence (number of consistent years in the district), and pertinent family characteristics (family structure, SES, language spoken in the home). Thus, language may be an important variable for its segregating effect, as it sets certain students apart from the mainstream and therefore exacerbates the alienation students feel upon their entry into a new school.

Summary

While our society is becoming an increasingly mobile one, the effects of mobility on educational attainment are not very conclusive. This is due to differential use of mobility and achievement measures and is confounded by other important variables. This study will explore the relationship between mobility and student achievement in a single school while controlling for other essential variables (i.e., SES, language, and family structure).

Research Design

The data for this study were collected by the Director of Research and Evaluation in the Orange School District. The district is located in Orange, New Jersey, a small urban city with a population of 31,590. It is located in the metropolitan New York area on the Western boundaries of the city of Newark. The school district is made up of 4,242 students and nine

schools, seven of which are elementary (K-6), one a middle school (7-8), and one a high school (9-12). The annual district expenditure at Orange High School is $5,372 per pupil.

This research was conducted at Orange High School, which has a total enrollment of 1,135 students and employs 43 teachers. Tenth graders (class of 1991) who had taken the state mandated test (HSPT) were selected for the sample (N=198), because they had the most recent scores available, providing us with the largest sample possible of any high school class. The information used in this study was taken from the students' cumulative transcript files covering grades kindergarten to ninth.

Data and Measurement

Throughout this study the relationship of primary interest was mobility and student achievement. Data on students' family structure, language spoken, and SES were also collected and were used as control variables in the analysis.

Student Mobility Data

Student mobility was measured in three ways: by the number of consecutive uninterrupted years in the district, the number of moves, and the distance of the move. Table 1 represents the number of consecutive years students were enrolled in the district. Forty-seven percent of the sample had been enrolled in district schools for three years or less, and 24.0 percent of the students were enrolled in the district for ten years, forming a bimodal distribution of recent transfers and long-term enrollees. Of those students who were enrolled in the district for three years or less,

64.0 percent transferred from New Jersey public and parochial schools, 9.0 percent transferred from outside of the state, and 27.0 percent transferred from outside of the United States (not shown in table).

Table 1

Number of Consecutive Years Student Enrolled in District

Years enrolled in district	Number of students	Percent of students
1	24	12.0
2	42	21.0
3	28	14.0
4	13	7.0
5	11	5.5
6	9	4.5
7	7	3.5
8	7	3.5
9	10	5.0
10	47	24.0

Student transfer data were also analyzed by the frequency of moves (see Table 2). The majority of the students (61.5 percent) had one transfer, 10.5 percent had two or more transfers, and 27.0 percent of the students had no transfers (they entered the district between kindergarten and grade one). Thirty percent of the students entered the district between grades two and seven, and 43.0 percent entered between grades eight and ten (not shown in table).

Table 2

Number of Transfers

Number of transfers	Number of students	Percent of students
Zero	54	27.0
One	123	62.0
Two or more	21	11.0

Finally, student mobility was measured by the categories of transfers. There were four different types of transfers among students in our sample: students with no transfers, students who transferred between schools within the district, those who transferred into Orange from schools within the United States (parochial or public from New Jersey or out of state), and students who transferred into Orange from outside of the United States (see Table 3).

Table 3

Distance of Transfer

Distance of transfer	Number of students	Percent of students
No transfers	54	27.0
Within district transfer	18	9.0
Within United States transfer	93	47.0
Outside United States transfer	33	17.0

The origins of the 33 students who transferred into the district from another country are displayed in Table 4. Most of these countries are underdeveloped with educational systems that are underfunded and not academically comparable to the American educational system. These countries are also culturally quite distinct from the United States, another probable hindrance to the academic performance of students transferring into the United States.

Table 4

Out of Country Transfers

Country transferred from	Number of students
Haiti	11
Jamaica	4
Trinidad	4
Guyana	2
Uruguay	2
El Salvador	1
Martinique	1
Argentina	1
Guadelupe	1
Ethiopia	1
Vietnam	1
Peru	1

Note: Data on country of origin were available for only 30 of the 33 students.

Student Achievement Data

Student achievement was measured using students' total HSPT scores. These scores were obtained by averaging students' reading, writing, and math HSPT results. The 198 tenth graders comprising our sample took the HSPT in 1987-88, their freshman year. All of New Jersey's high school students are required to pass the HSPT to graduate. According to the laws governing New Jersey high school graduation, students must receive a passing score on each section of the test to obtain a diploma. Passing scores for the test administered during the 1987-88 school year were 75 reading, 77 writing, 61 math. The test is initially administered in ninth grade; students failing any of the sections have the opportunity to retake those sections in subsequent years (two retests anually).

To test the reliability of averaging students' HSPT scores, intercorrelations were run to analyze the extent of scale item cluster. The SPSS reliability program yielded a scale alpha of .84 and a standardized item alpha of .88, which exceeded the acceptable level of .60. Inter-item correlations were additionally run, and these indicated that each item could explain at least 55 percent (R^2 = .548) of the variance for the scaled measure of HSPT student achievement (see Appendix A for details). The mean of students' combined HSPT scores was 75.7 with a standard deviation of 15.7.

Non-mobility Data

Family structure was defined by whether a student lives with two parents, one parent, relatives or other (see Table 5). Fifty percent of the students came from a two parent household, 44.0 percent lived with one parent, and 6.0 percent lived with relatives or others.

Table 5

Family Structure of Students

Family structure	Number of students	Percent of students
Two parents	99	50
One parent	86	44
Relatives/other	11	6

Note: Data on family structure were available for 196 of the 198 students.

Language was based on student transcript information regarding the language spoken at home with four categories: English only, Spanish only, English and Spanish, English and other (see Table 6). Over three-fourths of the students in the district spoke only English. Of those students who spoke other languages, 17 transferred into the high school from within the United States, and 20 transferred into the high school from outside of the United States (not shown in table).

Table 6

Language Spoken at Home

Language category	Number of students	Percent of students
English only	159	81.0
Spanish only	3	2.0
English & Spanish	13	6.6
English & other	21	10.7

Note: Data on language spoken at home were available for 196 of the 198 students.

Students' SES was defined by their eligibility for free lunch (see Appendix B for district requirements). Nineteen percent of the students in the sample were eligible for free lunch (see Table 7).

Table 7

Free Lunch Eligibility

Eligible for free lunch	Number of students	Percentage of students
Yes	38	19.3
No	159	80.7

Note: Data on free lunch availability were available for 197 of the 198 students.

Analysis Techniques

The hypothesized relationship, that the greater the student mobility the lower the student achievement, was analyzed using forced entry stepwise regression with even inclusion levels. This method was employed in order to specify "a priori" the variables that affect student achievement. The three non-mobility variables were included in the model first as a way of removing their effects so that the importance of the mobility factors could more clearly be assessed. Each of the three mobility variables were then added in successive steps.

In the first step the non-mobility variables family structure, language, and SES were included in the model to determine the extent to which these variables affected student achievement. In step two, family structure, language, SES, and number of transfers (the first mobility indicator) were included to ascertain their effect on student achievement. In step three, family, language, SES, number of transfers, and the next

mobility indicator, years spent outside of the district, were regressed on student achievement. Finally, in the last step family, language, SES, number of transfers, and years outside of the district, were combined with distance of transfer (the final mobility indicator) to determine their impact on student achievement.

A beta was employed to assess the strength of the relationship between both mobility and non-mobility variables and student achievement. A beta communicates the strength of the relationship between two variables; the higher the beta, the greater the association. This study will rely on betas to discuss the comparability of the independent variables' effects on student achievement, because the independent variables differ substantially in units of measurement and the beta standardizes these differences.

Results

Table 8 is a summary of the regression coefficients for the effect of the independent variables on the dependent variable, student achievement. The numbers in parentheses, horizontally and vertically, represent the steps in the regression. In step one of the regression analysis, with family structure, language, and SES (all recoded as dichotomous variables) regressed on the dependent variable student achievement, SES is not significantly related to student achievement ($p > .05$). That is, whether or not students are eligible for free lunch is not associated with their HSPT performance. Family structure is significantly related to HSPT, and language is strongly related to HSPT. Students who live with relatives or one parent, as opposed to students who live with both parents are more likely to score lower on the HSPT. Indeed, on average these students scored 3.4 points less on the HSPT than others (data not presented in the table).

Students who speak only English score much higher on the HSPT than students who speak English and another language or only other languages. Students from homes where English is the only language spoken score 7.4 points higher than other students (data not presented in the table). Language, with a beta of .243 is a more important indicator of HSPT performance than family structure, with a beta of .144. With all three variables combined in this initial step of the regression, the R^2 of .075 indicates that seven percent of the variance in HSPT scores can be attributed to SES, family structure, and language.

Table 8

Stepwise Regression Coefficients for Effects on Student Achievement

Variables	(1)	(2)	(3)	(4)
(1)				
Free Lunch (SES)	-.063	-.064	-.055	-.054
Family Structure	-.144*	-.145*	-.122	-.120
Language	-.243***	-.244***	-.238***	-.226**
(2)				
Number of Transfers		.014	.043	.070
(3)				
Years Enrolled			-.138	-.122
(4)				
Distance of Transfer				-.048
R2	.075	.092	.093	.093
R^2 change	---	.017	.001	.000

* p ≤ .05
** p ≤ .01
*** p ≤ .001

In step two, the addition of the number of times each student transferred (the first mobility variable) adds no significant explanatory power to the model. The number of times students transferred within the district or into the district is not related to HSPT performance.

In step three, the number of consecutive years spent in the district is not significantly related to HSPT scores. This variable was recoded into a dichotomous variable, because most of the variability was found between two categories, with one representing those students with four or less years in the district and zero representing those students with five to ten years in the district. The addition of years spent in the district to the model does not create any change in the relationship of language to HSPT scores, but family structure loses its significance. Thus the number of consecutive years spent in the district as a measure of student mobility is not a powerful predictor of HSPT scores.

In the final step the distance of the student transfer was recoded as a dichotomous variable, with one representing students transferring from outside of the United States and zero representing students transferring into the district from within the United States, because most of the variability existed between these two categories. The distance of the student transfer is not significantly related to students' HSPT performance. That is, students who transferred into the Orange School District from outside of the United States score no differently than those students who transferred from another New Jersey district, parochial school, or another state. No explanatory power is added to the model with the addition of this variable (an R^2 change of .000). When all mobility and non-mobility

variables are included in the model, only language spoken has an effect on student HSPT scores. Non-English speaking students score lower on the HSPT by almost six points.

Conclusions

The results of this study indicate that there is high mobility of students in the sample, and mobility does not impact on student achievement. The mobility factors only explained 1.8 percent (R^2 change of .017 and .001 in steps two, three, and four) more of student achievement than the non-mobility factors did, and none of the mobility variables added statistically significant contributions to the model. Student language is the only variable consistently related to HSPT performance for students who transferred into the district from both outside of the United States and within the United States. Even with the mobility factors taken into consideration, students who spoke only English scored almost six points higher on the HSPT than students who did not speak only English.

Whether or not a student speaks only English at home is an area that the Orange School District can concern itself with as it strives to improve student achievement. These students can be put into a more intensive English class, for instance, and their English scores can be monitored closely by teachers. Also, parents can be encouraged to work with their children in English and speak English with them. Cultural differences may be partially responsible for this disparity in achievement: immigrant households may emphasize academic achievement in a different manner. The educational levels of parents of these students may also impact on the students' desires to excel in school as well. The segregating effect of

language addressed by Sraits (1987) and Calabrese (1989) can perhaps be lessened by academically and socially integrated activities in the school, such as peer-tutoring.

While this study shows negligible effects of mobility on student achievement, this does not deny the highly mobile nature of the students sampled. There is a high influx of students moving into the district from out of the country and other school districts in New Jersey and almost half of the students in the sample have been enrolled in the district for three years or less. The measures of mobility employed in this study may not be sufficiently sensitive to pick up effects. Other variables, such as attendance and other home environment factors, could not be used for this analysis, because they were unavailable through the district. Also, some of the variables used in this analysis were not thorough measures of important variables, such as free lunch eligibility as a measure of SES, yet they were the only variables available. Improved measures and mechanisms for accurate recordkeeping and data collection may result in more valid analyses.

Finally, the study is limited because of its restricted sample, only tenth graders and not the entire high school population. There may have been circumstances that existed only in test administration for tenth graders which did not exist for students in other grades. Different results might have been obtained with a larger sample.

While mobility is certainly an issue to be addressed by the district, it is most likely an indicator of a large bilingual and foreign population within the school. Rather than concerning itself with an uprooted student population, the real issue here seems to be one of language and cultural differences which are affecting student achievement.

APPENDIX A

Item-Total Correlations

HSPT Reading	.788
HSPT Writing	.742
HSPT Math	.741

Alpha for the scale reliability = .839

Standardized item alpha for the scale reliability = .877

APPENDIX B

Fiscal Year 1990
Income Eligibility Guide For Free Lunch

HOUSEHOLD SIZE	FREE MEALS OR MILK			REDUCED PRICE MEALS		
	Annual	Monthly	Weekly	Annual	Monthly	Weekly
1	7,774	648	150	11,063	922	213
2	10,426	869	201	14,837	1,237	286
3	13,078	1,090	252	18,611	1,551	358
4	15,730	1,311	303	22,385	1,866	431
5	18,382	1,532	354	26,159	2,180	504
6	21,034	1,753	405	29,933	2,495	576
7	23,686	1,974	456	33,707	2,809	649
8	26,338	2,195	507	37,481	3,124	721
Each Additional Household Member	+2,652	+221	+51	+3,774	+315	+73

When weekly income is reported on free and reduced price applications, the amount must be multiplied by 4.33 to determine the monthly income. 7CFR Part 245.2(e)

When bi-weekly income is reported on free and reduced price applications, the amount must be multiplied by 2.15 to determine the monthly income. 7CFR Part 245.2(e)

When bi-monthly income is reported on free and reduced price applications, the amount must be multiplied by 2 to determine the monthly income. 7CFR Part 245.2(e)